08 Apr 1996

CEIM-P (25-1a)

MEMORANDUM FOR ALL HQUSACE ELEMENTS AND USACE COMMANDS

SUBJECT: Year 2000 Advisory

1. References:

    a. Memorandum HQDA SAIS-IIAC, 13 MAR 96, subject: Project
Change of Century Action Plan.

    b. ER 25-1-2, Life Cycle Management of Automated Information
Systems (AIS).

2. Numerous references have begun to appear in the popular press
regarding the impending **YEAR 2000** date problem. This issue
involves the inability of many computers, commercial-off-the-
shelf (COTS) software packages, and in-house software
applications, to process appropriately date arithmetic involving
the year 2000. This has significant potential negative impacts
for the Corps.

3. There are less than four years remaining to identify and
resolve all of the Corps YEAR 2000 date problems. The issue is
real, and it affects virtually all our team members --from our
Commanders to all individuals who must rely on output from any of
our automated information systems. In-house applications used
for out year budgeting have already experienced failures. The
magnitude of the problem and the seriousness of its potential
impact on **all** classes, categories, and types of Corps information
systems, including management and business, scientific and
engineering, process control, and others, cannot be
overemphasized.

4. Addressing the Year 2000 problem as a normal part of system
maintenance or operating under the assumption that our hardware
inventory will be totally replaced, and thus the problem will "go
away" by the Year 2000, are inappropriate approaches to
addressing this issue. No DoD funds will be available either to
identify or to correct the vulnerabilities at the MACOM level.
In fact, DOD has placed the leadership and resource
responsibility at each of the Functional Proponent levels. It
will be up to the local commander and/or AIS Functional
Proponents/Program Managers to identify, fund, and correct all

YEAR 2000 vulnerabilities identified in hardware, in-house applications, and COTS.

CEIM-P
SUBJECT: Year 2000 Advisory

5. Based on reference 1a, a series of surveys will be conducted to better assist both our Headquarters and HQDA in assessing the depth and breadth of YEAR 2000 impact on the Corps, particularly in terms of our AIS. We will be inventorying our AIS, beginning with those for which the Corps is responsible at the Army level, and then working our way down to Command unique systems. Each AIS Functional Proponent should expect to be prepared to answer detailed sets of questions concerning the Year 2000 issue for his/her application, with an end goal of certification to HQUSACE and HQDA ensuring operational compliance.

6. Additional information on the nature and scope of the YEAR 2000 problem is at the enclosure, including World Wide Web (WWW) resources which may be of assistance. Please make widest distribution of this information, including distribution to AIS Functional Proponents, Program Managers, Data Managers, and Chiefs/Directors of Information Management.

7. For AIS development or modernization which is supported by contract resources, language should be in place to require Year 2000 compliance in all software contract deliverables. All microcomputer hardware acquisitions should include contract language requiring the vendor to certify to the government that the proposed hardware Basic-Input-Output System (BIOS)/motherboard will "rollover" properly at midnight on December 31, 1999, and recognize the year 2000, and that it will continue to do so without additional operator intervention. All COTS software acquisitions should also require that the requesting office certify that they have researched the matter and ascertained that the requested COTS software is "year 2000" aware. Milestone Decision Authority (MDA) reviews and approvals are other key decision intervals which we must use to assure Year 2000 compliance.

8. We intend to aggressively work the YEAR 2000 issue within the Command, and will be passing along information updates as we receive them. We will also be calling for periodic updates on progress for meeting Year 2000 transition goals within each of our organizations, and for each of our corporate AIS. This is an iterative process, and we will manage it accordingly.

CEIM-P
SUBJECT: Year 2000 Advisory

9. Points of contact are Mr. Meredith C. Walters, CEIM-P, (202) 761-4732, (Meredith.C.Walters@USACE.ARMY.MIL), or Mr. Laurens T. Kennedy, CEIM-P, (202) 761-1627,(Laurens.T.Kennedy@USACE.ARMY. MIL).

FOR THE COMMANDER:

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Year 2000 Advisory

1. **GENERAL.** The YEAR 2000 date problem impacts on all classes, categories, and types of Corps information systems, including management and business, scientific and engineering, process control, and others. Problems encountered will vary from the cosmetic (wrong date headings on reports), to the inconvenient (improper sorts), to the fatal (absolute failure of mission critical systems). More subtle problems may not even be immediately apparent.

2. **THREE FACETS OF THE PROBLEM.** This problem has three (3) faces:

    a. **Hardware problems** - the failure of most computers with a pre-1996 Basic Input Output System (BIOS) and motherboard to "rollover" correctly on December 31, 1999 - going to either 1900 or 198x;

    b. **Commercial-Off-The-Shelf (COTS) software problems** - the failure of much of the existing software base to "rollover" on December 31, 1999 - in some cases locking up the system and all the resident data; and

    c. **Applications software problems** - for any operating automated information system (AIS) which either chose to use a two digit date field (00 - 99) by software developer decision, or was only allowed to use a two digit date field by the implementing medium(s) - programming language, database management system, or operating system. Additional issues may arise from a programming "convention" of using the year "99" as an end-of-file indicator.

3. **PERSONAL COMPUTERS.** Preliminary investigations have indicated that 6 in 10 or more personal computers currently in use will not rollover correctly on December 31, 1999. In some cases these systems can be reset to the correct date manually, in others the systems can be "fooled" into adopting the correct date by the insertion of a small program into the AUTOEXEC.BAT file. All remaining systems will require a replacement of the BIOS or BIOS and motherboard. No information exists to permit an "academic" diagnosis of any given PC; testing is strictly a "hands on" process. Results may not necessarily be extrapolated across any manufacturer's product line due to the propensity within the industry to change sources for critical components, like "motherboards." *A recommended testing procedure downloaded from the INTERNET follows this document.* Given the Corps tendency towards continuous modernization, this facet of the

problem may be self correcting, as most of the current PC inventory may well have been replaced by December 31, 1999. Nevertheless, any 286's or 386's, and many 486's within the current inventory will fail on December 31, 1999, causing significant problems for the operators at that time. What is the magnitude of the problem? If we assume an approximate 28,000 PC baseline in the Corps, and a static PC inventory, and estimate an average cost of $50.00 for an upgraded BIOS (if one is available) plus $75.00 for installation and reconfiguration, this leaves a possible unbudgeted expense of up to $3.5M for workstations alone.

4. **CEAP-IA INFRASTRUCTURE**. The Corps current infrastructure standards --SUN/Solaris and ORACLE are Year 2000 compatible. The previous infrastructure standards -- CDC 4xxx/EP/IX platforms and ORACLE, and the CDC 9XX/NOS platforms with ORACLE are all scheduled for replacement prior to December 31, 1999.

5. **COMMERCIAL OFF-THE-SHELF SOFTWARE (COTS)**. Some COTS software has been determined not only to fail, but to completely lock up the system and all related data files. No information exists to permit an "academic" diagnosis of any given COTS; testing is strictly a hands on process, and given results may not necessarily be extrapolated across any manufacturer's product line, or even across the same versions of the product. New COTS version numbers are generally assigned only for major new releases, with interim product fixes randomly distributed. This facet of the problem primarily focuses on PC software packages (e.g., word processing packages, spreadsheets, database management systems, query packages, etc.) which all may be subject to failure on December 31, 1999. Most minicomputer software is currently Year 2000 aware and compatible.

6. **AUTOMATED INFORMATION SYSTEMS (AIS).** By far the most critical aspect of the problem is the potential failure of corporate AIS. Critical corporate systems involving outyear budgeting have already failed to go beyond 1999. These problems may be intrinsic to the software for AIS implemented in currently or previously popular PC COTS packages (such as various Xbase dialects), or they may be purely a result of implementation/development decisions. No substantive third party reference exists to permit diagnosis of whether or not a problem will occur. In the case of local Xbase dialect applications, this problem may be further complicated by the absence of a reliable version of source code for the application. The corporate relational database management system (RDBMS), ORACLE, and the corporate operating system, SOLARIS (a UNIX variant) handle the Year 2000 without difficulty. This is not to say that applications implemented in these tools are automatically safe. All existing AIS must be tested for rollover, and, if they fail, must be inspected by hand, line by line, in order to repair them.

In addition, all legacy data must be adjusted. Furthermore, many systems have faulty date logic identifying the Year 2000 as a non-leap year --the Year 2000 IS A LEAP YEAR!

7.   **IMPACT AMONG AIS**. The impact of changing one system can affect interoperability with other AIS and, as such, must be coordinated and managed to handle new date related interface changes. Where do your systems get their data? With what systems and external organizations do your systems interface? Identifying these specific interfaces and dependencies becomes an important aspect to a successful Year 2000 transition. This is a particular challenge within the Corps, as AIS are managed and maintained in a decentralized manner by a wide number of Functional Proponents at all organizational levels.

8.   **TOOLS TO ADDRESS THE PROBLEM.** Significant numbers of tools are available to assist in solving this problem - for COBOL, FORTRAN or RPG language applications, and for the IBM/PCM family of mainframe/minicomputer operating systems products. There are no known tools available to address older Xbase dialect applications, e.g., dBase II/III, Clipper, FoxPro, etc., nor are there any known tools to address problems in ORACLE based applications, since the problem would be systems developer originated and *native to the application* rather than a shortcoming of the implementing medium.

9.   **WORLD WIDE WEB SITES (WWW).** At the present time, information is available through the following WWW resources:

http://www.army.mil/disc4-pg/test/iiac/y2k/index~1.htm

http://www.nismc.navy.mil

http://www.year2000.com/cgi-bin/clock.cgi

http://www.auditserve.com/yr2000/countdown.cgi

http://www.software.ibm.com/year2000/paper.html

http://testor.uta.edu/~fadi/2000.html

10. **THE BOTTOM LINE.** The time to begin both planning and your Year 2000 transition is **now**. Identify which hardware, COTS, and applications within your command or area of responsibility will be impacted and determine the extent/specifics of the problem. This is the inventory and assess phase. The next step is to plan and prioritize identified changes. What modifications are required? Who will be responsible? Is there an order for change, based on mission criticality or systems interrelationships? How many man months will it take to complete and test the identified necessary changes? What are the

resources required? What is the appropriate technical and
management approach? Based on answers to these type questions,
actual changing, testing, and implementation can then take place
in an orderly fashion. Proper data administration, prototyping,
parallel development, testing, and quality assurance are all
critical factors for assuring a smooth Year 2000 transition.

PERSONAL COMPUTER REAL TIME CLOCK ROLLOVER TEST

The PC date and time problem results from code carried over from the old IBM PC AT BIOS. Do not conduct these tests on systems containing date sensitive passwords until such passwords have been deactivated; otherwise you may lock the machine with all passwords expired.

PHASE I.

1. Set the systems date to 31 Dec 1999.

2. Set the systems clock to 23:58 (11:58 p.m.).

3. Check that the date and time have been set using **DATE** and **TIME** commands.

4. Power down the machine.

5. Wait five minutes.

6. Switch the machine back on.

7. Check the date and time. It should be a few minutes after midnight on the first of January 2000.

PHASE II.

1. Set the date to 01 Jan 2000.

2. Check that the date has been set using the **DATE** command.

3. Power down the machine.

4. Wait one minute or so.

5. Switch the machine back on.

6. The machine should still exhibit an 01 Jan 2000 date.

PHASE III.

1. Reset the correct systems date.

2. Reset the correct systems time.

If the system in question fails either or both of these tests, it will probably have to be replaced. Additional information on the Year 2000 problem and its implications for

hardware and software can be found on the INTERNET at
http://www.year2000.com.